Singapore is at an earlier stage in its vaccination rollout than the UK or Israel. Its domestic situation is more similar to New Zealand, with generally very low numbers of cases throughout the duration of the pandemic.[1]

23. Singapore has administered over 5 million doses of vaccines. Slightly more than 50% of the population have received the first dose of the vaccine, while about 36% of the population have received both doses. They are using Pfizer/BioNTech and Moderna vaccines and have good vaccination rates within those that work in high-risk settings (e.g hospitals and airports).

24. Singapore recently experienced an increase in community cases of COVID-19 which peaked in May 2021 with over 200 cases reported in a week. The vaccination programme was about half as advanced as it is now.

Figure 3: Vaccination and case rates in Singapore, 2021

COVID-19 vaccine doses administered per 100 people
Total number of vaccination doses administered per 100 people in the total population. This is counted as a single dose, and may not equal the total number of people vaccinated, depending on the specific dose regime (e.g. people receive multiple doses).
Our World in Data
LINEAR
LOG
Add country
Singapore
80
60
40
20
0
Jan 11, 2021
Feb 4, 2021
Mar 16, 2021
Apr 25, 2021
Jun 21, 2021
Source: Official data collated by Our World in Data – Last updated
Daily new confirmed COVID-19 cases
Shown is the rolling 7-day average. The number of confirmed cases is lower than the number of actual cases; the main reason for that is limited testing.
Our World in Data
LINEAR
LOG
Add country
35
30
25
20
15
10
5
0
Singapore
Jan 1, 2021
Feb 4, 2021
Mar 16, 2021
Apr 25, 2021
Jun 4, 2021
Jun 27, 2021
Source: Johns Hopkins University CSSE COVID-19 Data
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[1] *This section draws on reporting from New Zealand's High Commission in Singapore.*

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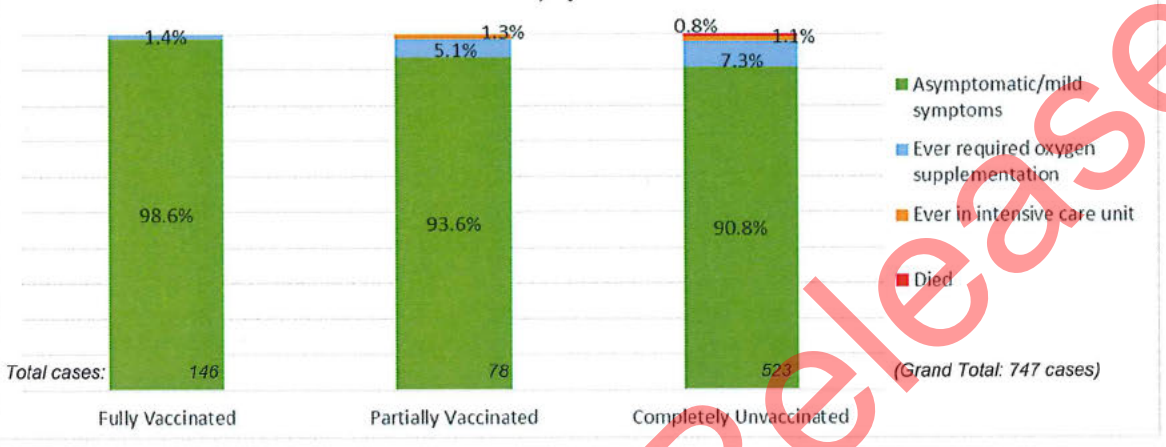
25. Despite vaccination, there were 146 fully vaccinated and 78 partially vaccinated individuals who tested positive for COVID-19. Over the course of the outbreak, around 1 case in every 6 were among the vaccinated. These individuals have experienced milder symptoms: only 2 fully vaccinated individuals (of 146) experienced a moderate case of COVID-19 (briefly requiring oxygen) and there have been no ICU admissions within this group. This contrasts with 44 (out of 523) unvaccinated individuals with more severe cases of COVID-19.

Figure 4: Breakdown of Local Singapore Cases Since 28 April by Vaccination Status and Severity of Condition



26. Transmission of the virus by vaccinated individuals is possible, and has been documented among household contacts. Singapore has not yet analysed the duration of infectivity among those who are fully vaccinated, nor observed any differences in transmission rates between Pfizer/BioNTech and Moderna vaccinations.

27. Singaporean officials expect that cases are more likely to be unlinked as a population becomes increasingly vaccinated, because any 'breakthrough' cases are likely to be asymptomatic or result only in mild illness.

28. Ministry of Health and DPMC officials will follow up with Singaporean officials to draw further insights which can be applied to outbreak management in a partially vaccinated population.

29. Singapore continues to follow a strict approach at the border to keep new cases of COVID-19 from entering the community.

The United States of America has some of the highest rates of vaccination in the world, but with significant differential in uptake within the population

30. With nearly half of the population fully vaccinated the United States of America (the US), has also seen significant decreases in new cases being reported. Beneath this high average vaccination rate there are significant disparities at the state level. Lower vaccine uptake is correlated with a variety of factors: these states are more likely to be rural, have state governments that implemented limited risk mitigations, and have lower compliance with other public health measures. Many of these factors also correlate with citizens' political preferences.

31. A peak of over 300,000 cases reported on the 8th of January 2021 has decreased to a rolling 7-day average of around 14,000 new cases by June 2021. In March 2021, the CDC estimated that as many as 35% of the population of the US have been infected with COVID-19 since the beginning of the pandemic; natural immunity, alongside the immunisation

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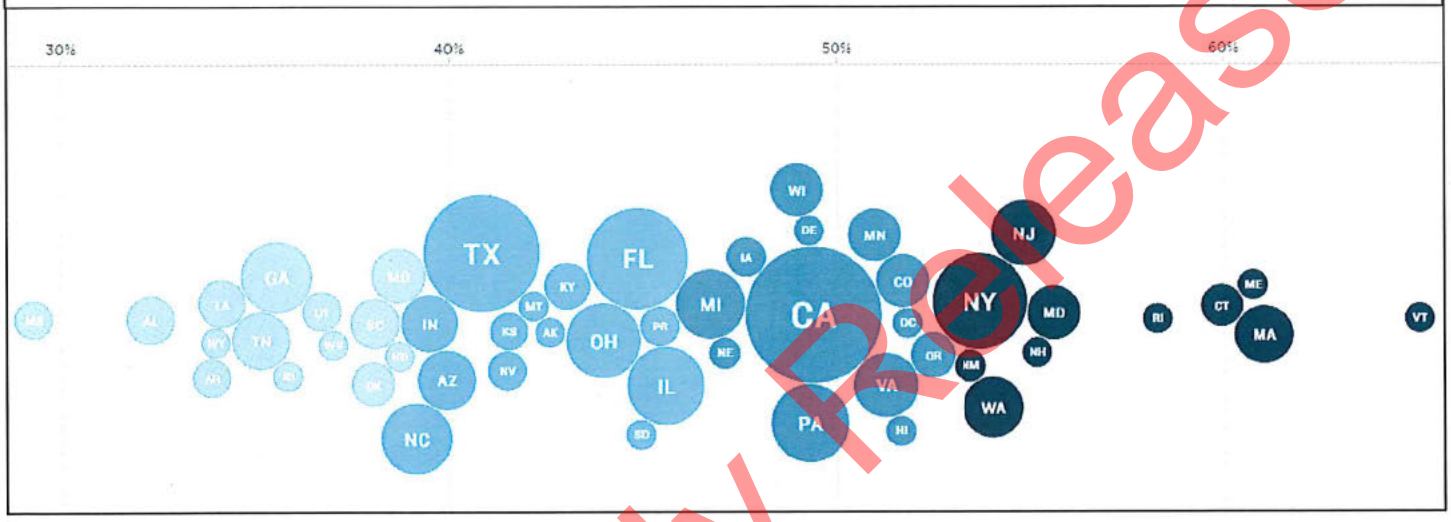
rollout, may have played a role in limiting community transmission without the implementation of tight restrictions – but a range of restrictions have remained in place, many at the state level.

32. Looking ahead, we would expect differential vaccination rates to lead to different transmission dynamics at the state-level. This may have implications for how we consider the risk of travellers from the US, given the heterogeneity in the degree of population protection we would expect.

Figure 5: Percentage of state's population fully vaccinated, 27 June. Size of circle represents state's population size.

Source: CDC. Visualisation: NPR



Summary and Next Steps

33. Officials do not consider there to be international evidence that refutes the key conclusions of the vaccination modelling we have seen to date. Indeed, there is emerging evidence which supports the key messages:

    a) Population immunity (without public health controls in place) is likely to require a very high rate of vaccination.

    b) We will continue to need risk mitigation measures in place at the border and in the community, and our calibration of these measures may need to change as vaccination rates increase.

34. Israel and Singapore have implemented a range of risk mitigation measures similar to those used within New Zealand as part of the elimination strategy, including border restrictions, PCR testing, isolation of high-risk travellers. Both have also used mask mandates to help reduce the spread of variants of concern within their communities.

35. The modelling steering group will continue to monitor international developments and consider modelling outputs in that context. There are four areas of interest as further data emerges:

    a) Given high and increasing rates of vaccination in some adult populations – particularly in the UK and Israel - can we learn more about the susceptibility of children, their role in transmission and, hence, their importance for building population protection?

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b) As countries and regions with different rates of vaccination experience outbreaks, can we learn more about outbreak dynamics and the interventions required to control outbreaks at different points of the vaccine rollout, by:

   i) comparing non-pharmaceutical interventions required to minimise transmission within similarly vaccinated populations? *and*

   ii) comparing the same non-pharmaceutical interventions when applied to different populations with significantly different rates of vaccination?

c) Officials of the Ministry of Health and DPMC will meet with Singaporean officials to gather further insights regarding outbreak management in a partially vaccinated population, given the relatively similar epidemiological context and objectives.

d) How does the relationship between case numbers and hospitalisations or fatalities evolve in highly vaccinated populations with sustained transmission of COVID-19, such as the UK?

Consultation

36. Officials from the Modelling Steering Group were consulted in generating this briefing, which includes the Ministry of Health, Department of the Prime Minister and Cabinet, StatsNZ, the Treasury, Ministry of Business, Innovation and Employment and the Ministry of Social Development.

37. This briefing draws on open source material and conversations with/reporting from New Zealand's High Commission in Singapore, the Prime Minister's Chief Science Advisor (and team) and Rodney Jones (Wigram Capital).

Communications

38. There are no direct communications implications arising from this briefing.

39. The content of this briefing may be useful if questions arise following the publication of initial modelling results by Te Pūnaha Matatini on Wednesday 30 June 2021.

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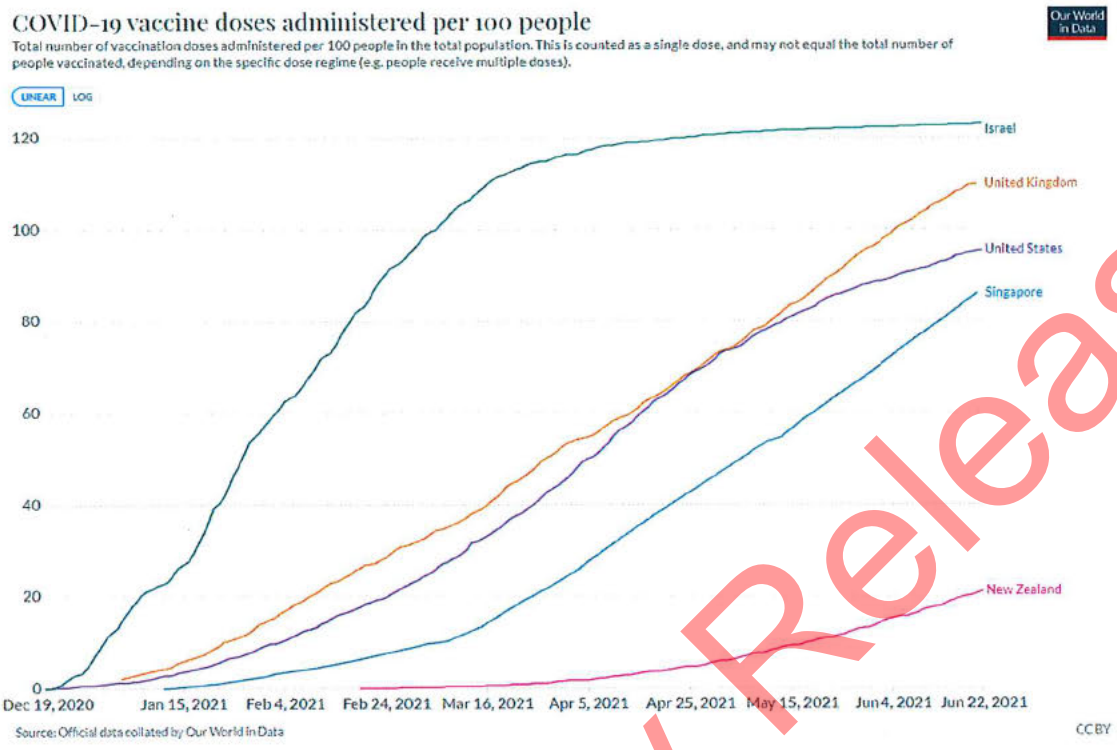
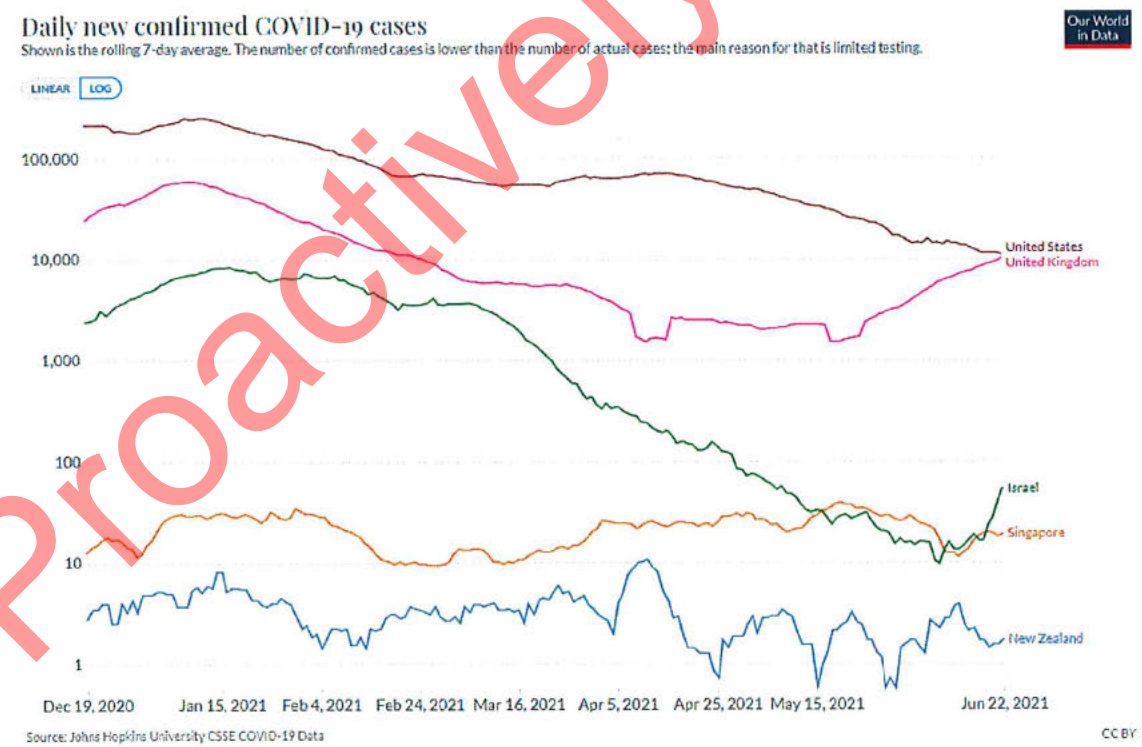
ATTACHMENT A

Vaccination rates, cases, deaths, restrictions in selected countries





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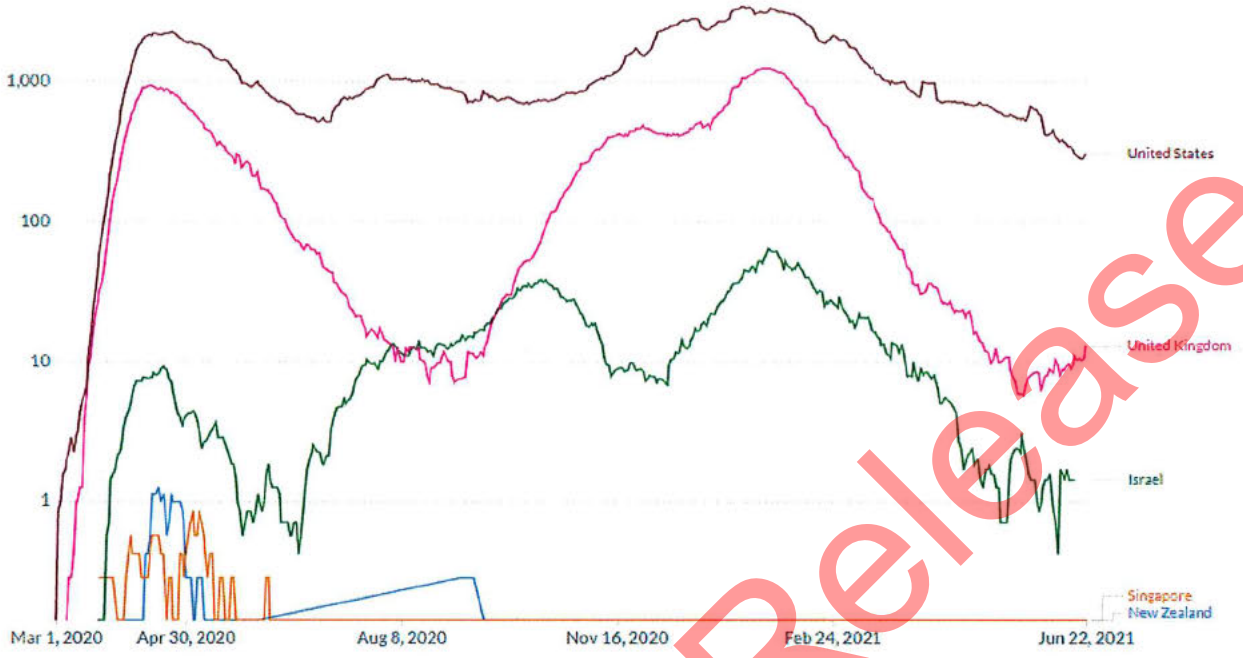
Daily new confirmed COVID-19 deaths

Our World in Data

Shown is the rolling 7-day average. Limited testing and challenges in the attribution of the cause of death means that the number of confirmed deaths may not be an accurate count of the true number of deaths from COVID-19.

LINEAR LOG



Source: Johns Hopkins University CSSE COVID-19 Data

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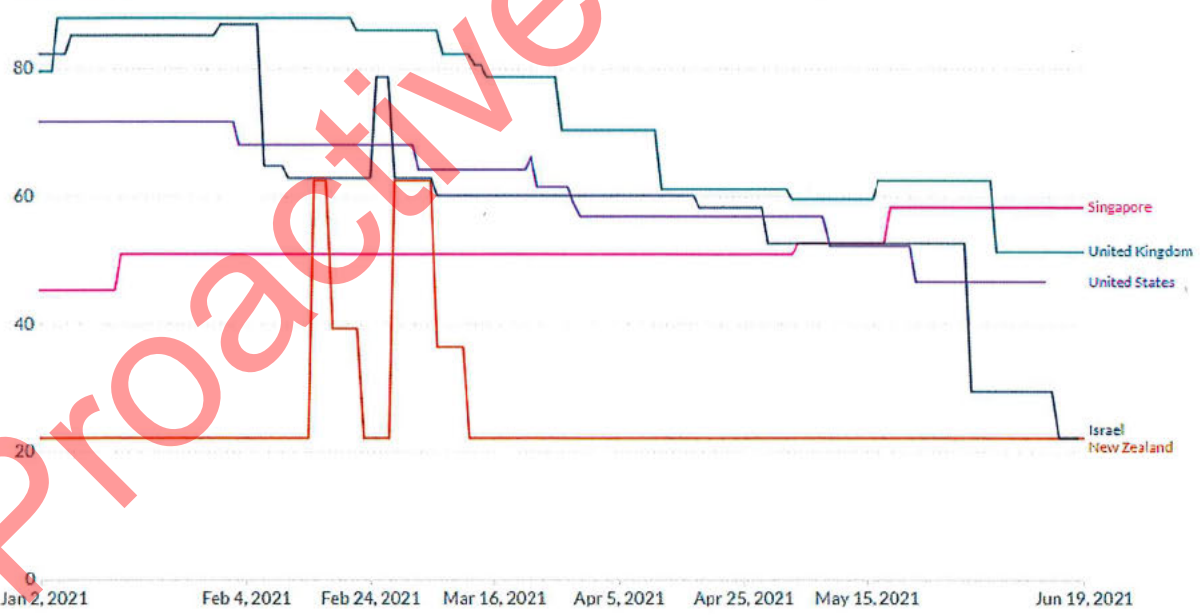
COVID-19: Stringency Index

Our World in Data

This is a composite measure based on nine response indicators including school closures, workplace closures, and travel bans, rescaled to a value from 0 to 100 (100 = strictest). If policies vary at the subnational level, the index is shown as the response level of the strictest sub-region.

Add country



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DEPARTMENT OF THE PRIME MINISTER AND CABINET
TE TARI O TE PIRIMIA ME TE KOMITI MATUA

ATTACHMENT B

Table of Vaccination and New Case Rates of Jurisdictions Reviewed in this Paper

Country *(vaccines used)*	Population partially vaccinated (%)	Population fully vaccinated (%)	People aged 12+ with first dose (%)	People aged 12+ with second dose (%)	New cases, June 2021 daily average	New cases per million, June 2021 daily average
Israel *(Pfizer-BioNTech)*	61.3	57.0	82.8	77.1	52	6
United Kingdom *(Pfizer-BioNTech, Moderna, Astrazeneca, Janssen, Novavax)*	66.3	48.6	75.7	55.3	8876	131
USA *(Pfizer-BioNTech, Moderna, Janssen)*	54.0	46.1	63.2	50.6	13615	41
Singapore *(Pfizer-BioNTech, Moderna)*	52.1	36.1	56.3	39.0	18	3
New Zealand *(Pfizer-BioNTech)*	13.0	7.7	15.6	9.4	2	0.5
Source (at 28 June)	*Bloomberg vaccine tracker*	*Bloomberg vaccine tracker*	*The Economist*	*The Economist*	*Our world in data*	*Our world in data*

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